Third United Nations International Conference on the Peaceful Uses of Atomic Energy

A/CONF.28/A/604
SWEDEN
February 1964
Original: ENGLISH

Confidential until official release during Conference

Abstract

Current Methods for Long-Term Planning of Electricity Supply in Sweden

N. Holmin [1], G. Lindström [2], M. Mårtensson [3]

The Swedish power system is at present almost entirely based on hydro power but as the cheap hydro resources are being utilized new generating capacity will mainly be thermal in the 1970's.

With special reference to Swedish conditions the methods used by the power companies for optimising their power systems are described.

Different methods used for near-term and long-term forecasts of power consumption are given. The importance for the long-term planning of parameters such as cost of capital and labour, fuel costs and other parameters is discussed. The cost functions for different means of power generation, namely hydro power stations including storage, conventional steam power stations and nuclear power stations, and transmission are given, and the methods used for forecasting possible future trends in relative costs are presented. The problem of reserve capacity as a limiting factor with regard to unit size is discussed.

Based on the forecasts with regard to demand and costs, the most economical composition of the future power generation system is calculated with methods based upon programmes used by the power companies to achieve optimum utilization of water storage resources. A detailed presentation is given on methods used for optimising a system containing generating capacities in the form of conventional steam power and nuclear power with different cost characteristics as a supplement to hydro power. The distinction between a

1) State Power Board, Stockholm
2) AB Skandinaviska Elverk, Stockholm
3) AB Atomenergi, Stockholm

predominantly hydroelectric system and a pure thermal system with regard to the function of thermal power and, specially, nuclear power is discussed. In a hydro electric system the nuclear power has to be matched not only to the conventional thermal power, but also to the water storage reservoirs and the in-flow statistics to those. Thereby, it is possible to achieve a high load factor for the nuclear power, by means of the storage system itself and an operating scheme based on the evaluation of the incremental water value.

Numerical examples are given for Swedish conditions and in particular the economical penalties inflicted, if costs should develop in another direction, different to the one used in optimising the system.